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Environmental Radiation Data, Report 40
October-December 1984

(U.S.) Eastern Environmental Radiation Facility
Montgomery, AL

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Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama, and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS).

The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water, and milk samples from which environmental radiation levels are derived.

The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium.

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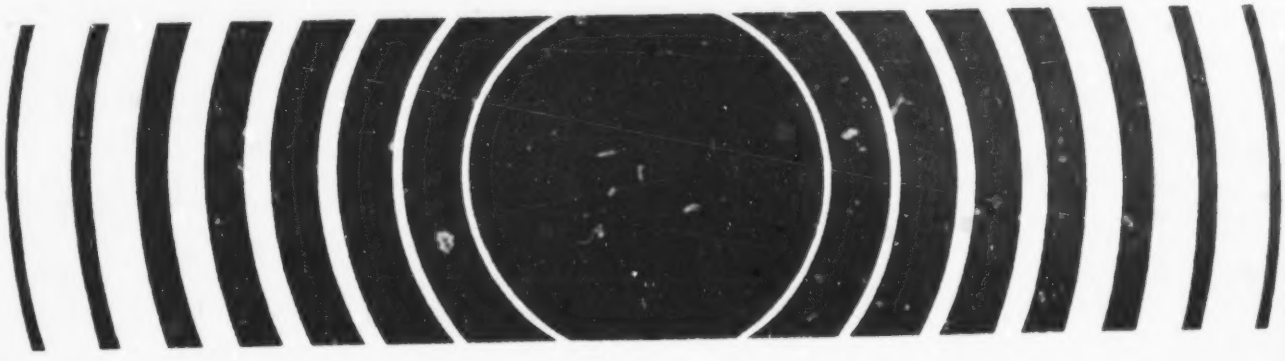

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E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 40

October - December 1984

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama, and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available.

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water, and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium. This monitoring effort also provides ancillary information on natural background levels and on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication facilities, and reprocessing plants.

ENVIRONMENTAL RADIATION DATA

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DATA - Reporting Rationale and Procedures

The U.S. Environmental Protection Agency's Office of Radiation Programs, in 1973, established the Environmental Radiation Monitoring System(ERAMS) to provide continuous, accurate, and usable environmental radiation data to the public. Thus, ERAMS data for all specific radionuclide analyses are reported as the counting results indicate, whether the numbers are negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. All reported values are corrected for decay to the collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in Table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 nCi/m^2(a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10-cm diameter synthetic fiber) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed on samples which exceed 2 pCi/liter gross alpha.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for October - December 1984.

Tables 5 - 7 present the monthly average gross beta concentration in precipitation October - December 1984.

The tritium in precipitation samples for October - December 1984 at the selected stations are shown in Table 8.

A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36109.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
OCTOBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	3.3	0.1	1.5	0.02	0.00	0.01
AR:LITTLE ROCK	9	0.2	0.1	0.1	0.01	0.00	0.01
CA:BERKELEY	8	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	10	0.7	0.0	0.5	0.02	0.00	0.01
CO:DENVER	5	0.0	0.0	0.0	0.02	0.01	0.02
CT:HARTFORD	9	0.6	0.1	0.2	0.01	0.01	0.01
DE:WILMINGTON	8	0.8	0.0	0.3	0.02	0.01	0.01
FL:JACKSONVILLE	9	0.2	0.0	0.1	0.02	0.01	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.02	0.00	0.01
HI:HONOLULU	8	0.5	0.1	0.2	0.01	0.00	0.00
IA:IOWA CITY	8	0.3	0.0	0.1	0.01	0.00	0.01
ID:BOISE	9	0.9	0.1	0.5	0.04	0.00	0.01
ID:IDAHO FALLS	9	0.0	0.0	0.0	0.03	0.01	0.02
IL:CHICAGO	8	0.3	0.1	0.2	0.02	0.01	0.01
IN:INDIANAPOLIS	6	0.9	0.2	0.5	0.02	0.01	0.01
KS:TOPEKA	9	0.6	0.1	0.2	0.01	0.00	0.00
ME:AUGUSTA	9	0.7	0.1	0.3	0.01	0.01	0.01
MI:LANSING	9	0.6	0.1	0.3	0.02	0.01	0.01
MN:MINNEAPOLIS	8	0.6	0.1	0.3	0.02	0.01	0.01
MO:JEFFERSON CITY	9	1.4	0.2	0.6	0.03	0.01	0.02
MS:JACKSON	9	1.5	0.1	0.4	0.03	0.01	0.02
NC:CHARLOTTE	9	0.3	0.0	0.1	0.03	0.00	0.01
NC:WILMINGTON	7	0.1	0.0	0.1	0.02	0.00	0.01
ND:BISMARCK	9	0.9	0.1	0.4	0.03	0.01	0.02
NH:CONCORD	9	0.5	0.0	0.2	0.01	0.01	0.01
NJ:TRENTON	4	1.1	0.3	0.5	0.01	0.00	0.01
NM:SANTA FE	3	0.3	0.2	0.3	0.01	0.01	0.01
NV:LAS VEGAS	9	0.4	0.1	0.2	0.03	0.01	0.02
NY:ALBANY	4	0.2	0.0	0.1	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.4	0.1	0.2	0.02	0.01	0.01
NY:SYRACUSE	5	0.2	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	9	0.1	0.0	0.0	0.02	0.00	0.01
OH:COLUMBUS	9	0.5	0.1	0.3	0.02	0.00	0.02
OH:PAINESVILLE	8	0.3	0.1	0.2	0.02	0.01	0.01
OH:TOLEDO	8	0.6	0.1	0.3	0.02	0.01	0.01
OK:OKLAHOMA CITY	7	0.7	0.3	0.5	0.03	0.00	0.01
OR:PORTLAND	7	0.0	0.0	0.0	0.02	0.00	0.01

TABLE 2 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
OCTOBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
PA:GOLDSBORO	4	0.4	0.1	0.2	0.01	0.01	0.01
PA:HARRISBURG	8	1.0	0.1	0.5	0.02	0.01	0.02
RI:PROVIDENCE	5	0.2	0.0	0.1	0.01	0.01	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.02	0.00	0.01
SC:COLUMBIA	9	1.1	0.1	0.4	0.06	0.01	0.02
TN:KNOXVILLE	10	1.2	0.1	0.6	0.03	0.01	0.01
TN:NASHVILLE	3	0.0	0.0	0.0	0.03	0.01	0.02
TX:AUSTIN	9	1.3	0.3	0.5	0.04	0.01	0.01
TX:EL PASO	9	0.7	0.1	0.5	0.02	0.01	0.01
VA:LYNCHBURG	9	2.0	0.0	0.8	0.02	0.00	0.01
VA:VIRGINIA BEACH	2	0.1	0.1	0.1	0.01	0.01	0.01
WA:SEATTLE	9	0.1	0.0	0.0	0.01	0.00	0.01
WA:SPOKANE	9	1.0	0.2	0.5	0.03	0.00	0.01
WI:MADISON	9	0.5	0.0	0.2	0.01	0.00	0.01
WV:CHARLESTON	7	0.8	0.0	0.4	0.03	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
NOVEMBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:ASHFORD	4	0.0	0.0	0.0	0.01	0.00	0.01
AL:MONTGOMERY	9	0.7	0.1	0.5	0.01	0.01	0.01
AR:LITTLE ROCK	5	0.1	0.0	0.0	0.01	0.01	0.01
AZ:TEMPE	7	4.6	0.0	1.7	0.03	0.00	0.02
CA:BERKELEY	9	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	8	1.0	0.2	0.4	0.01	0.01	0.01
CO:DENVER	6	0.0	0.0	0.0	0.06	0.00	0.02
CT:HARTFORD	9	0.5	0.1	0.2	0.01	0.00	0.01
DE:WILMINGTON	9	0.4	0.0	0.2	0.02	0.00	0.01
FL:JACKSONVILLE	9	0.5	0.0	0.1	0.01	0.00	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.01	0.00	0.00
HI:HONOLULU	9	0.2	0.0	0.1	0.01	0.00	0.00
IA:IOWA CITY	9	0.5	0.0	0.2	0.02	0.01	0.01
ID:BOISE	7	0.6	0.1	0.2	0.02	0.00	0.01
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.02	0.00	0.01
IL:CHICAGO	9	0.7	0.1	0.3	0.02	0.01	0.01
IN:INDIANAPOLIS	6	0.6	0.3	0.4	0.02	0.01	0.01
KS:TOPEKA	8	0.4	0.1	0.3	0.01	0.00	0.00
ME:AUGUSTA	8	0.3	0.1	0.2	0.03	0.00	0.01
MI:LANSING	9	0.2	0.0	0.1	0.01	0.00	0.01
MN:MINNEAPOLIS	9	1.9	0.1	0.5	0.07	0.01	0.02
MO:JEFFERSON CITY	8	0.5	0.1	0.3	0.02	0.01	0.01
MS:JACKSON	9	0.4	0.1	0.2	0.03	0.01	0.01
NC:CHARLOTTE	4	0.2	0.1	0.1	0.01	0.01	0.01
NC:WILMINGTON	8	0.2	0.0	0.1	0.01	0.01	0.01
ND:BISMARCK	9	1.9	0.0	0.5	0.03	0.00	0.02
NH:CONCORD	9	0.5	0.0	0.2	0.02	0.00	0.01
NJ:TRENTON	8	0.6	0.0	0.2	0.01	0.01	0.01
NM:SANTA FE	3	0.7	0.3	0.5	0.02	0.01	0.01
NV:LAS VEGAS	9	0.4	0.0	0.2	0.03	0.01	0.01
NY:ALBANY	4	0.3	0.0	0.1	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	8	0.2	0.0	0.1	0.01	0.01	0.01
NY:SYRACUSE	4	0.1	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	8	0.1	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	9	0.2	0.1	0.2	0.02	0.01	0.02
OH:PAINESVILLE	9	0.2	0.0	0.1	0.02	0.01	0.01
OH:TOLEDO	9	0.5	0.1	0.3	0.02	0.01	0.01

TABLE 3 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
NOVEMBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
OK:OKLAHOMA CITY	7	1.2	0.1	0.5	0.01	0.00	0.01
OR:PORTLAND	6	0.0	0.0	0.0	0.01	0.00	0.00
PA:GOLDSBORO	3	0.3	0.0	0.1	0.01	0.00	0.01
RI:PROVIDENCE	5	0.3	0.1	0.2	0.01	0.01	0.01
SC:BARNWELL	1	0.0	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	8	1.3	0.1	0.5	0.05	0.01	0.02
SD:PIERRE	6	1.3	0.2	0.6	0.03	0.01	0.02
TN:KNOXVILLE	6	1.1	0.1	0.4	0.02	0.00	0.01
TN:NASHVILLE	3	1.9	0.5	1.1	0.01	0.01	0.01
TX:AUSTIN	8	0.8	0.3	0.6	0.02	0.01	0.01
TX:EL PASO	7	0.8	0.5	0.7	0.02	0.01	0.01
VA:LYNCHBURG	8	0.8	0.1	0.4	0.02	0.01	0.01
WA:SEATTLE	6	0.0	0.0	0.0	0.02	0.00	0.01
WA:SPOKANE	9	0.2	0.1	0.1	0.01	0.00	0.01
WI:MADISON	8	0.7	0.1	0.3	0.01	0.01	0.01
WV:CHARLESTON	5	0.9	0.1	0.4	0.01	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
DECEMBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:ASHFORD	6	0.0	0.0	0.0	0.01	0.00	0.01
AL:MONTGOMERY	9	1.5	0.1	0.6	0.02	0.00	0.01
AR:LITTLE ROCK	7	0.1	0.0	0.1	0.02	0.01	0.01
AZ:TEMPE	4	2.2	0.6	1.5	0.02	0.01	0.02
CA:BERKELEY	8	0.2	0.0	0.1	0.02	0.00	0.01
CA:LOS ANGELES	8	0.7	0.1	0.3	0.02	0.00	0.01
CT:HARTFORD	9	0.2	0.1	0.1	0.01	0.01	0.01
DE:WILMINGTON	8	0.9	0.0	0.3	0.03	0.01	0.01
FL:JACKSONVILLE	7	0.2	0.1	0.1	0.02	0.01	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.01	0.00	0.01
HI:HONOLULU	9	0.2	0.0	0.1	0.01	0.00	0.01
IA:IOWA CITY	8	1.1	0.1	0.3	0.03	0.01	0.02
ID:BOISE	9	0.3	0.1	0.1	0.04	0.00	0.02
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.03	0.01	0.02
IL:CHICAGO	7	0.4	0.1	0.2	0.02	0.01	0.02
KS:TOPEKA	7	0.5	0.1	0.3	0.01	0.00	0.01
ME:AUGUSTA	9	0.1	0.0	0.1	0.02	0.01	0.01
MI:LANSING	8	0.2	0.0	0.1	0.02	0.01	0.01
MN:MINNEAPOLIS	9	0.4	0.1	0.2	0.03	0.01	0.02
MO:JEFFERSON CITY	8	0.8	0.2	0.4	0.03	0.01	0.02
MS:JACKSON	8	0.4	0.1	0.2	0.02	0.01	0.01
NC:CHARLOTTE	5	0.2	0.0	0.1	0.02	0.01	0.01
NC:WILMINGTON	8	0.1	0.1	0.1	0.02	0.01	0.01
ND:BISMARCK	8	0.2	0.0	0.1	0.02	0.01	0.02
NH:CONCORD	8	0.1	0.0	0.1	0.01	0.00	0.01
NJ:TRENTON	8	0.2	0.0	0.1	0.01	0.00	0.01
NM:SANTA FE	2	0.2	0.2	0.2	0.02	0.01	0.01
NV:LAS VEGAS	9	0.4	0.1	0.2	0.02	0.01	0.01
NY:ALBANY	4	0.1	0.0	0.1	0.02	0.01	0.02
NY:NEW YORK CITY	9	0.2	0.0	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.2	0.1	0.1	0.01	0.01	0.01
NY:SYRACUSE	6	0.2	0.0	0.1	0.02	0.01	0.01
NY:YAPHANK	6	0.1	0.0	0.0	0.02	0.01	0.01
OH:COLUMBUS	7	0.2	0.1	0.1	0.02	0.01	0.02
OH:PAINESVILLE	7	0.3	0.0	0.1	0.02	0.01	0.01
OH:TOLEDO	8	0.3	0.2	0.3	0.03	0.01	0.02
OK:OKLAHOMA CITY	8	1.1	0.1	0.5	0.03	0.00	0.01
OR:PORTLAND	9	0.0	0.0	0.0	0.02	0.00	0.01

TABLE 4 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
DECEMBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
PA:GOLDSBORO	9	0.2	0.0	0.0	0.03	0.01	0.01
PA:HARRISBURG	9	0.4	0.0	0.2	0.04	0.01	0.02
RI:PROVIDENCE	3	0.2	0.0	0.1	0.02	0.00	0.01
SC:BARNWELL	2	0.1	0.0	0.1	0.00	0.00	0.00
SC:COLUMBIA	7	0.9	0.1	0.4	0.04	0.01	0.02
SD:PIERRE	8	0.4	0.0	0.2	0.02	0.01	0.02
TN:KNOXVILLE	6	0.6	0.1	0.3	0.02	0.01	0.01
TN:NASHVILLE	3	0.0	0.0	0.0	0.03	0.02	0.02
TX:AUSTIN	8	0.8	0.3	0.5	0.03	0.01	0.01
TX:EL PASO	6	0.6	0.3	0.6	0.02	0.01	0.02
VA:LYNCHBURG	6	1.0	0.1	0.4	0.02	0.01	0.01
VA:VIRGINIA BEACH	1	0.1	0.1	0.1	0.01	0.01	0.01
WA:SEATTLE	6	0.1	0.0	0.0	0.02	0.00	0.00
WA:SPOKANE	9	0.1	0.0	0.1	0.03	0.00	0.01
WI:MADISON	7	0.4	0.1	0.2	0.02	0.01	0.02
WV:CHARLESTON	6	0.2	0.1	0.2	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

OCTOBER 1984

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	158.8	0.12	0.07	ND
AR:LITTLE ROCK	70.8	0.05	0.03	ND
CA:BERKELEY	49.1	0.03	0.02	ND
CO:DENVER	49.8	0.05	0.02	ND
CT:HARTFORD	50.8	0.17	0.03	ND
DC:WASHINGTON	50.0	0.04	0.03	ND
DE:WILMINGTON	100.0	0.22	0.06	ND
FL:JACKSONVILLE	107.3	0.05	0.05	ND
FL:MIAMI	81.2	0.08	0.04	ND
ID:BOISE	33.0	0.09	0.02	ND
ID:IDAHO FALLS	12.5	0.03	0.01	ND
IL:CHICAGO	52.2	0.01	0.02	ND
IN:INDIANAPOLIS	10.0	0.00	0.00	ND
MI:LANSING	109.0	0.04	0.05	ND
MN:MINNEAPOLIS	133.9	0.03	0.06	ND
MS:JACKSON	45.0	0.02	0.02	ND
ND:BISMARCK	8.9	0.01	0.00	ND
NH:CONCORD	150.8	0.31	0.08	ND
NJ:TRENTON	64.6	0.22	0.04	ND
NY:ALBANY	62.9	0.10	0.03	ND
NY:NEW YORK CITY	40.0	0.05	0.02	ND
NY:NIAGARA FALLS	5.4	0.01	0.00	ND
NY:YAPHANK	87.5	0.14	0.04	ND
OH:COLUMBUS	109.1	0.08	0.06	ND
OH:PAINESVILLE	48.8	0.10	0.03	ND
OH:TOLEDO	38.8	0.04	0.02	ND
OR:PORTLAND	186.3	0.24	0.09	ND
PA:HARRISBURG	30.8	0.06	0.02	ND
RI:PROVIDENCE	85.0	0.23	0.05	ND
SC:BARNWELL	15.0	0.02	0.01	ND
SC:COLUMBIA	27.5	0.12	0.02	ND
TN:KNOXVILLE	102.5	0.15	0.05	ND
TN:NASHVILLE	25.0	0.01	0.01	ND
TX:AUSTIN	60.0	0.00	0.03	ND
TX:EL PASO	16.0	0.01	0.01	ND
VA:LYNCHBURG	45.0	0.18	0.03	ND
VA:VIRGINIA BEACH	35.0	0.12	0.02	ND
WA:SEATTLE	37.5	0.00	0.01	ND
WI:MADISON	131.0	0.38	0.09	ND

ND NO GAMMA ACTIVITY DETECTABLE

s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

NOVEMBER 1984

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± 2s	SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	35.0	0.05	0.02	ND
AR:LITTLE ROCK	37.9	0.06	0.02	ND
CA:BERKELEY	178.1	0.17	0.08	ND
CT:HARTFORD	23.1	0.03	0.01	ND
DC:WASHINGTON	32.3	0.01	0.01	ND
DE:WILMINGTON	33.8	0.03	0.02	ND
FL:JACKSONVILLE	93.7	0.05	0.05	ND
FL:MIAMI	95.0	0.14	0.05	ND
ID:BOISE	89.5	0.12	0.04	ND
ID:IDAHO FALLS	34.0	0.04	0.01	ND
IL:CHICAGO	74.6	0.08	0.04	ND
MI:LANSING	78.0	0.07	0.03	ND
MN:MINNEAPOLIS	7.7	0.08	0.01	ND
MS:JACKSON	42.8	0.04	0.02	ND
ND:BISMARCK	20.5	0.03	0.01	ND
NH:CONCORD	69.5	0.03	0.03	ND
NJ:TRENTON	59.7	0.09	0.03	ND
NV:LAS VEGAS	25.0	0.04	0.01	ND
NY:ALBANY	20.0	0.03	0.01	ND
NY:NEW YORK CITY	32.7	0.05	0.02	ND
NY:NIAGARA FALLS	61.8	0.03	0.03	ND
NY:YAPHANK	32.5	0.01	0.01	ND
OH:COLUMBUS	107.3	0.06	0.04	ND
OH:PAINESVILLE	133.1	0.15	0.06	ND
OH:TOLEDO	63.1	0.11	0.03	ND
OR:PORTLAND	229.8	0.35	0.12	ND
PA:HARRISBURG	194.0	0.27	0.09	ND
RI:PROVIDENCE	50.0	0.04	0.02	ND
SC:BARNWELL	3.7	0.01	0.00	ND
SC:COLUMBIA	63.3	0.08	0.03	ND
TN:KNOXVILLE	20.0	0.02	0.01	ND
TN:NASHVILLE	23.6	0.02	0.01	ND
TX:AUSTIN	25.0	0.03	0.01	ND
VA:LYNCHBURG	80.5	0.34	0.06	ND
VA:VIRGINIA BEACH	15.0	0.02	0.01	ND
WA:SEATTLE	162.6	0.11	0.08	ND
WI:MADISON	120.8	0.08	0.06	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

DECEMBER 1984

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± 2s	SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	100.0	0.10	0.05	ND
AR:LITTLE ROCK	35.4	0.06	0.02	ND
CA:BERKELEY	86.4	0.15	0.05	ND
CT:HARTFORD	59.8	0.22	0.04	ND
FL:JACKSONVILLE	6.9	0.01	0.00	ND
FL:MIAMI	18.7	0.05	0.01	ND
ID:BOISE	32.5	0.05	0.02	ND
ID:IDAHO FALLS	48.0	0.06	0.03	ND
IL:CHICAGO	76.3	0.26	0.05	ND
MI:LANSING	100.4	0.17	0.05	ND
MN:MINNEAPOLIS	45.3	0.45	0.05	ND
MS:JACKSON	21.9	0.03	0.01	ND
ND:BISMARCK	4.7	0.01	0.00	ND
NJ:TRENTON	68.7	0.14	0.04	ND
NV:LAS VEGAS	10.0	0.02	0.01	ND
NY:ALBANY	56.2	0.08	0.03	ND
NY:NEW YORK CITY	50.6	0.07	0.02	ND
NY:NIAGARA FALLS	90.3	0.10	0.04	ND
NY:YAPHANK	51.3	0.09	0.03	ND
OH:COLUMBUS	93.7	0.20	0.05	ND
OH:PAINESVILLE	83.8	0.30	0.06	ND
OH:TOLEDO	28.8	0.05	0.02	ND
OR:PORTLAND	65.6	0.14	0.04	ND
RI:PROVIDENCE	60.0	0.10	0.03	ND
SC:BARNWELL	18.7	0.03	0.01	ND
SC:COLUMBIA	10.0	0.02	0.01	ND
TN:NASHVILLE	42.3	0.15	0.03	ND
TX:AUSTIN	27.5	0.04	0.02	ND
VA:LYNCHBURG	70.8	0.42	0.05	ND
VA:VIRGINIA BEACH	41.5	0.06	0.02	ND
WA:SEATTLE	100.0	0.23	0.06	ND
WI:MADISON	17.3	0.03	0.01	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1984

LOCATION	OCTOBER nCi/l ± 2s	NOVEMBER nCi/l ± 2s	DECEMBER nCi/l ± 2s
AL:MONTGOMERY	0.1 0.2	0.3 0.2	0.2 0.2
AR:LITTLE ROCK	0.3 0.2	0.2 0.2	0.2 0.2
CA:BERKELEY	0.3 0.2	0.2 0.2	0.2 0.2
CO:DENVER	0.3 0.2	NS	NS
CT:HARTFORD	0.2 0.2	0.2 0.2	0.2 0.2
DC:WASHINGTON	0.2 0.2	0.1 0.2	NS
DE:WILMINGTON	0.1 0.2	0.1 0.2	NS
FL:JACKSONVILLE	0.1 0.2	0.1 0.2	0.1 0.2
FL:MIAMI	0.1 0.2	0.2 0.2	0.2 0.2
ID:BOISE	0.2 0.2	0.2 0.2	0.3 0.2
ID:IDAHO FALLS	0.3 0.2	0.2 0.2	0.3 0.2
IL:CHICAGO	0.1 0.2	0.3 0.2	0.2 0.2
IN:INDIANAPOLIS	0.2 0.2	NS	NS
MI:LANSING	0.2 0.2	0.2 0.2	0.2 0.2
MN:MINNEAPOLIS	0.2 0.2	0.4 0.2	0.1 0.2
MS:JACKSON	0.1 0.2	0.2 0.2	0.2 0.2
ND:BISMARCK	0.2 0.2	0.2 0.2	0.1 0.2
NH:CONCORD	0.2 0.2	0.2 0.2	NS
NJ:TRENTON	0.3 0.2	0.1 0.2	0.1 0.2
NV:LAS VEGAS	NS	0.1 0.2	0.2 0.2
NY:ALBANY	0.3 0.2	0.2 0.2	0.2 0.2
NY:NEW YORK CITY	0.2 0.2	0.1 0.2	0.2 0.2
NY:NIAGARA FALLS	0.2 0.2	0.2 0.2	0.1 0.2
NY:YAPHANK	0.1 0.2	0.1 0.2	0.1 0.2
OH:COLUMBUS	0.2 0.2	0.3 0.2	0.2 0.2
OH:PAINESVILLE	0.2 0.2	0.2 0.2	0.2 0.2
OH:TOLEDO	0.2 0.2	0.2 0.2	0.2 0.2
OR:PORTLAND	0.3 0.2	0.2 0.2	0.2 0.2
PA:HARRISBURG	0.2 0.2	0.2 0.2	NS
RI:PROVIDENCE	0.2 0.2	0.1 0.2	0.1 0.2
SC:BARNWELL	1.3 0.2	0.3 0.2	2.3 0.2
SC:COLUMBIA	0.3 0.2	0.5 0.2	0.2 0.2
TN:KNOXVILLE	0.2 0.2	0.2 0.2	NS
TN:NASHVILLE	0.3 0.2	0.2 0.2	0.2 0.2

TABLE 8 (CONTINUED)

PRECIPITATION
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1984

	OCTOBER	NOVEMBER	DECEMBER
LOCATION	nCi/l ± 2s	nCi/l ± 2s	nCi/l ± 2s
TX:AUSTIN	0.2 0.2	0.1 0.2	0.2 0.2
TX:EL PASO	0.3 0.2	NS	NS
VA:LYNCHBURG	0.1 0.2	0.2 0.2	0.2 0.2
VA:VIRGINIA BEACH	0.2 0.2	0.1 0.2	0.2 0.2
WA:SEATTLE	0.3 0.2	0.2 0.2	0.3 0.2
WI:MADISON	0.1 0.2	0.1 0.2	0.2 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the 67 continuously operating airborne particulate samplers.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air passing through the filters normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for October - December 1983 are shown in Table 9.

TABLE 9

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
OCTOBER - DECEMBER 1983 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± 2s	^{239}Pu aCi/m^3 ± 2s	^{234}U aCi/m^3 ± 2s	^{235}U aCi/m^3 ± 2s	^{238}U aCi/m^3 ± 2s
AL:MONTGOMERY	1.2 1.0	0.6 0.7	22.2 4.7	2.7 1.5	20.9 4.6
AL:MONTGOMERY	0.1 0.5	1.2 0.7	22.1 6.2	1.1 1.5	12.8 4.4
CA:BERKELEY	0.3 0.3	0.3 0.4	6.4 1.6	0.3 0.4	6.7 1.6
CA:LOS ANGELES	0.0 0.4	0.7 0.5	15.1 3.6	2.0 1.1	21.6 4.6
CT:HARTFORD	0.7 0.5	0.1 0.2	9.0 1.6	0.3 0.2	9.3 1.6
DE:WILMINGTON	0.6 0.4	0.4 0.4	9.2 1.9	0.4 0.4	7.0 1.6
FL:JACKSONVILLE	0.7 0.6	0.5 0.6	9.2 2.1	0.9 0.6	11.4 2.4
FL:MIAMI	0.6 0.5	0.7 0.5	8.4 1.8	0.8 0.5	10.8 2.1
HI:HONOLULU	-0.1 0.3	1.1 0.6	7.5 1.8	0.5 0.6	5.2 1.5
IA:IOWA CITY	-0.4 1.4	4.5 1.9	15.1 2.4	0.6 0.4	15.4 2.5
ID:BOISE	0.4 0.5	1.0 1.0	20.1 4.1	0.9 0.9	21.4 4.3
ID:IDAHO FALLS	0.3 0.4	0.5 0.4	20.3 3.1	0.6 0.4	17.6 2.8
IL:CHICAGO	0.1 0.2	3.0 1.1	21.4 4.4	2.1 1.1	16.1 3.6
IN:INDIANAPOLIS	0.8 0.7	0.6 0.8	32.3 5.1	1.2 0.8	23.7 4.2
ME:AUGUSTA	0.4 0.5	0.2 0.2	16.1 2.4	0.7 0.4	18.2 2.7
MI:LANSING	-0.1 0.5	0.1 1.9	35.0 6.4	1.8 1.2	28.7 5.6
MO:JEFFERSON CITY	0.3 0.6	0.5 0.5	18.2 3.4	0.3 0.4	11.3 2.6
MS:JACKSON	1.4 1.0	0.8 0.6	11.6 2.9	0.3 0.4	8.3 2.4
ND:BISMARCK	0.0 0.3	0.3 0.3	18.6 3.7	0.5 0.5	14.8 3.2
NH:CONCORD	-0.1 0.5	0.9 0.5	8.8 1.6	0.8 0.4	8.5 1.6
NJ:TRENTON	-1.1 1.0	0.6 0.8	12.0 3.4	0.9 1.0	12.5 3.5
NV:LAS VEGAS	1.6 1.1	1.0 0.9	118.8 19.1	1.1 1.3	81.1 14.4
NY:ALBANY	0.2 0.3	0.7 0.5	27.1 3.9	1.4 0.7	23.8 3.5
NY:NEW YORK CITY	0.3 0.6	0.5 0.5	34.6 6.3	0.9 0.8	19.4 4.2
NY:NIAGARA FALLS	0.3 0.4	0.0 0.3	24.8 3.5	1.7 0.7	25.6 3.6
NY:SYRACUSE	1.0 0.7	0.2 0.3	11.3 2.4	0.7 0.5	8.2 2.0
OH:COLUMBUS	0.1 0.3	2.8 1.2	39.0 9.9	1.1 1.0	38.7 10.4
OH:PAINESVILLE	0.0 0.0	1.8 0.8	11.9 1.8	0.5 0.3	10.1 1.6
OH:TOLEDO	0.3 0.4	0.9 0.6	26.7 4.1	1.7 0.8	19.1 3.2
OR:PORTLAND	0.0 0.3	1.2 0.7	10.7 2.2	0.6 0.4	12.2 2.4
PA:HARRISBURG	0.8 0.8	1.7 0.8	19.9 3.6	1.9 0.9	16.1 3.1
PA:PITTSBURGH	0.3 0.8	0.4 0.5	39.0 9.1	1.9 2.0	32.4 8.1
RI:PROVIDENCE	0.8 0.5	0.4 0.3	10.0 1.8	0.6 0.4	9.5 1.8
SC:BARNWELL	0.6 0.5	0.5 0.4	23.9 6.1	0.6 1.0	10.6 3.6
SC:COLUMBIA	0.2 0.4	0.2 0.4	23.3 4.1	1.6 0.9	27.2 4.5
SD:PIERRE	0.0 0.6	0.3 0.5	10.1 2.7	0.2 0.5	13.9 3.3
TN:KNOXVILLE	0.4 0.3	0.5 0.5	26.4 6.7	3.3 1.9	19.2 5.4
TN:NASHVILLE	2.3 1.5	0.9 0.8	29.5 5.7	1.3 1.0	23.0 4.2
TX:AUSTIN	0.8 0.8	0.4 0.5	11.1 2.9	0.6 0.6	10.9 2.9

TABLE 9 (CONTINUED)

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
OCTOBER - DECEMBER 1983 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± 2s	^{239}Pu aCi/m^3 ± 2s	^{234}U aCi/m^3 ± 2s	^{235}U aCi/m^3 ± 2s	^{238}U aCi/m^3 ± 2s
TX:EL PASO	0.6 0.6	1.4 1.0	54.3 13.8	2.7 2.5	40.5 11.3
UT:SALT LAKE CITY	0.3 0.3	0.5 0.3	19.5 5.2	0.5 0.6	14.0 4.2
VA:LYNCHBURG	0.3 0.4	0.7 0.6	417.4 43.7	11.1 2.2	20.0 3.3
VA:VIRGINIA BEACH	1.5 0.8	1.5 0.8	15.4 3.1	1.4 0.8	14.2 2.9
WA:SEATTLE	0.7 0.5	0.4 0.4	4.0 1.0	1.2 0.5	5.7 1.3
WA:SPOKANE	-0.1 0.5	0.9 0.5	38.2 8.5	1.0 1.0	20.7 5.5
WI:MADISON	0.3 0.3	1.9 0.8	4.1 1.2	0.6 0.4	3.9 1.1
WV:CHARLESTON	2.4 1.1	0.2 0.5	17.2 3.2	0.5 0.5	19.0 3.4

s SIGMA COUNTING ERROR

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers annually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

The Kr-85 results will be published when they are available.

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of nuclear fallout, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for October - December 1984 are given in Table 10.

TABLE 10

SURFACE WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1984

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL;DECATUR	TENNESSEE RIVER	10/ 4/84	0.3	0.2
AL:GORDAN	CHATTAHOOCHEE R.	10/18/84	0.2	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	10/ 2/84	0.3	0.2
AR:LITTLE ROCK	ARKANSAS RIVER	10/ 2/84	0.5	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	10/ 3/84	0.1	0.2
CA:EUREKA	HUMBOLDT BAY	10/ 4/84	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	11/27/84	0.3	0.2
CO:GREELEY	SOUTH PLATTE RIVER	10/ 9/84	0.2	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	11/ 1/84	0.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	11/ 6/84	0.1	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	10/ 8/84	0.2	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	10/ 9/84	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	11/ 7/84	0.1	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	10/ 9/84	0.1	0.2
ID:BUHL	SNAKE RIVER	10/15/84	0.2	0.2
IL:MOLINE	MISSISSIPPI RIVER	11/15/84	0.2	0.2
IL:MORRIS	ILLINOIS RIVER	10/13/84	0.2	0.2
IL:ZION	LAKE MICHIGAN	10/ 3/84	0.2	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	10/11/84	0.1	0.2
MA:PLYMOUTH	CAPE CODE BAY	10/10/84	0.2	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	10/ 9/84	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	10/ 9/84	0.3	0.2
ME:WISCASSET	MONTSEWAY BAY	10/16/84	0.3	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	10/ 6/84	0.2	0.2
MI:MONROE	LAKE ERIE	10/ 7/84	0.3	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	10/ 1/84	0.4	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	11/ 5/84	0.2	0.2
MN:RED WING	MISSISSIPPI RIVER	10/11/84	0.1	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	10/18/84	0.2	0.2
NC:CHARLOTTE	CATAWBA RIVER	10/ 8/84	0.4	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	10/ 3/84	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	11/15/84	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	11/13/84	0.3	0.2
NV:BOULDER CITY	COLORADO RIVER	10/12/84	0.2	0.2
NY:OSSINING	HUDSON RIVER	10/ 4/84	0.4	0.2
NY:OSWEGO	LAKE ONTARIO	10/31/84	0.3	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	10/ 3/84	0.2	0.2
OH:TOLEDO	LAKE ERIE	10/ 2/84	0.2	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	10/ 3/84	0.2	0.2

TABLE 10 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1984

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
SC:ALLENDALE	SAVANNAH RIVER	10/11/84	3.1	0.2
SC:BROAD RIVER	BROAD RIVER	10/10/84	0.2	0.2
SC:HARTSVILLE	LAKE ROBINSON	10/ 8/84	0.5	0.2
TN:DAISY	TENNESSEE RIVER	11/20/84	0.5	0.2
TN:KINGSTON	CLINCH RIVER	10/ 3/84	0.3	0.2
TX:EL PASO	RIO GRANDE	10/10/84	0.3	0.2
VA:DOSWELL	NORTH ANNA RIVER	10/ 5/84	1.4	0.2
WA:NORTHPORT	COLUMBIA RIVER	11/13/84	0.2	0.2
WA:RICHLAND	COLUMBIA RIVER	10/ 7/84	0.2	0.2
WI:TWO CREEKS	LAKE MICHIGAN	11/12/84	0.4	0.2
WI:VICTORY	MISSISSIPPI RIVER	10/ 9/84	0.2	0.2
WV:WHEELING	OHIO RIVER	10/ 3/84	0.2	0.2

s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis; (b) gross alpha, gross beta, strontium-90, and gamma on annual composites; (c) radium-226 if the gross alpha exceeds 2 pCi/l and radium-228 if the radium-226 falls between 3 and 5 pCi/l; (d) specific iodine-131 on one quarterly sample per year for each station; and (e) an annual composite for plutonium-238 and -239 and uranium-234, -235, and -238 for stations that demonstrate gross alpha levels greater than 2 pCi/l.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for October - December 1984 are shown in Table 11.

Plutonium and uranium analyses are similar to procedures given for air particulate samples. Analyses were altered to coincide with revised EPA standards. The results for 1983 composite samples are shown in Table 12.

Iodine-131 concentration in drinking water for 1984 is shown in Table 13.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

TABLE 11

DRINKING WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1984

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	10/12/84	0.3	0.2
AL:DOTHAN	10/17/84	0.4	0.2
AL:MONTGOMERY	10/ 5/84	0.2	0.2
AL:MUSCLE SHOALS	10/ 3/84	0.4	0.2
AL:SCOTTSBORO	10/ 2/84	0.3	0.2
AR:LITTLE ROCK	10/ 2/84	0.2	0.2
CA:BERKELEY	10/10/84	0.2	0.2
CA:LOS ANGELES	10/10/84	0.2	0.2
CO:DENVER	10/30/84	0.2	0.2
CO:PLATTEVILLE	10/24/84	0.3	0.2
CT:HARTFORD	10/ 4/84	0.1	0.2
DC:WASHINGTON	10/ 5/84	0.1	0.2
DE:DOVER	10/ 9/84	0.1	0.2
FL:MIAMI	10/ 1/84	0.1	0.2
FL:TAMPA	10/23/84	0.2	0.2
GA:SAVANNAH	10/15/84	3.2	0.2
HI:HONOLULU	10/22/84	0.2	0.2
IA:CEDAR RAPIDS	10/ 8/84	0.2	0.2
ID:BOISE	11/27/84	0.2	0.2
ID:IDAHO FALLS	10/15/84	0.2	0.2
IL:MORRIS	10/ 1/84	0.1	0.2
IL:W. CHICAGO	10/ 1/84	0.2	0.2
KS:TOPEKA	10/ 1/84	0.1	0.2
LA:NEW ORLEANS	10/30/84	0.3	0.2
MA:LAWRENCE	10/ 3/84	0.3	0.2
MD:BALTIMORE	10/ 4/84	0.1	0.2
MD:CONOWINGO	10/ 9/84	0.1	0.2
ME:AUGUSTA	10/ 1/84	0.1	0.2
MI:DETROIT	10/ 8/84	0.3	0.2
MI:GRAND RAPIDS	10/17/84	0.2	0.2
MN:MINNEAPOLIS	10/12/84	0.2	0.2
MN:RED WING	10/11/84	0.2	0.2
MS:JACKSON	10/ 4/84	0.2	0.2
MS:PORT GIBSON	10/ 9/84	0.2	0.2
NC:CHARLOTTE	10/ 8/84	0.2	0.2
NC:WILMINGTON	10/ 2/84	0.3	0.2
ND:BISMARCK	10/ 8/84	0.3	0.2
NE:LINCOLN	10/ 9/84	0.2	0.2

TABLE 11 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1984

LOCATION	DATE COLLECTED	nCi/l	± 2s
NH:CONCORD	10/ 2/84	0.1	0.2
NJ:TRENTON	10/23/84	0.2	0.2
NJ:WARETOWN	11/13/84	0.2	0.2
NV:LAS VEGAS	10/ 4/84	0.3	0.2
NY:ALBANY	10/ 5/84	0.2	0.2
NY:NEW YORK CITY	10/ 4/84	0.1	0.2
NY:NIAGARA FALLS	10/ 2/84	0.3	0.2
NY:SYRACUSE	10/29/84	0.2	0.2
OH:CINCINNATI	10/ 1/84	0.2	0.2
OH:COLUMBUS	10/ 5/84	0.1	0.2
OH:EAST LIVERPOOL	10/10/84	0.3	0.2
OH:PAINESVILLE	10/26/84	0.3	0.2
OH:TOLEDO	10/ 2/84	0.3	0.2
OK:OKLAHOMA CITY	10/ 3/84	0.1	0.2
OR:PORTLAND	10/ 3/84	0.1	0.2
PA:COLUMBIA	10/ 4/84	0.4	0.2
PA:HARRISBURG	10/ 3/84	0.1	0.2
PA:PITTSBURGH	10/10/84	0.1	0.2
PC:ANCON	10/29/84	0.2	0.2
RI:PROVIDENCE	10/12/84	0.2	0.2
SC:BARNWELL	11/ 1/84	0.2	0.2
SC:COLUMBIA	10/ 2/84	0.4	0.2
SC:HARTSVILLE	10/ 8/84	0.2	0.2
SC:JENKINSVILLE	10/12/84	0.2	0.2
SC:SENECA	10/17/84	0.3	0.2
TN:CHATTANOOGA	10/11/84	0.4	0.2
TN:KNOXVILLE	10/ 4/84	0.2	0.2
TX:AUSTIN	10/ 3/84	0.2	0.2
VA:DOSWELL	10/30/84	0.2	0.2
VA:LYNCHBURG	10/ 5/84	0.4	0.2
VA:VIRGINIA BEACH	10/12/84	0.3	0.2
VI:ST. THOMAS	10/17/84	0.1	0.2
WA:RICHLAND	10/ 7/84	0.2	0.2
WA:SEATTLE	10/ 5/84	0.3	0.2
WI:GENOA CITY	10/ 9/84	0.2	0.2
WI:MADISON	10/11/84	0.2	0.2

s SIGMA COUNTING ERROR

TABLE 12

PLUTONIUM AND URANIUM ANALYSES
OF
SELECTED DRINKING WATER COMPOSITE SAMPLES

1983

LOCATION	^{238}Pu pCi/l ± 2s		^{239}Pu pCi/l ± 2s		^{234}U pCi/l ± 2s		^{235}U pCi/l ± 2s		^{238}U pCi/l ± 2s	
CA:LOS ANGELES	0.024	0.015	-0.002	0.008	4.112	0.619	0.304	0.095	3.755	0.572
CO:DENVER	0.017	0.013	-0.007	0.010	0.913	0.122	0.019	0.010	0.609	0.088
CO:PLATTEVILLE	0.006	0.010	0.003	0.007	6.824	0.688	0.569	0.092	5.231	0.539
ID:IDAHO FALLS	0.013	0.013	0.002	0.007	0.703	0.110	0.027	0.020	0.209	0.051
IL:MORRIS	0.021	0.016	0.003	0.005	0.504	0.083	0.110	0.033	0.133	0.038
IL:W. CHICAGO	0.014	0.011	0.001	0.007	1.498	0.172	0.020	0.013	0.103	0.030
KS:TOPEKA	0.014	0.010	0.000	0.007	0.406	0.055	0.021	0.010	0.362	0.051
MN:RED WING	0.005	0.006	0.002	0.003	0.303	0.043	0.006	0.005	0.020	0.009
MS:PORT GIBSON	0.003	0.005	0.000	0.000	0.123	0.025	0.006	0.005	0.048	0.015
ND:BISMARCK	0.002	0.004	0.001	0.002	0.101	0.024	0.010	0.008	0.097	0.023
NE:LINCOLN	0.027	0.057	-0.001	0.017	3.357	0.463	0.204	0.077	2.849	0.408
NV:LAS VEGAS	.000	0.005	0.007	0.009	2.172	0.249	0.125	0.036	1.641	0.198
OH:COLUMBUS	0.005	0.006	0.000	0.000	0.043	0.015	0.006	0.006	0.028	0.012
SC:JENKINSVILLE	0.067	0.063	0.053	0.059	36.880	3.841	0.486	0.136	8.524	1.003
TN:KNOXVILLE	0.009	0.006	0.003	0.006	0.073	0.019	0.002	0.003	0.043	0.014

THE MINIMUM DETECTABLE LEVEL IS .015 pCi/SAMPLE, FOR EACH INDIVIDUAL ISOTOPE.

s SIGMA COUNTING ERROR

TABLE 13

IODINE-131 IN DRINKING WATER
1984

LOCATION	DATE COLLECTED	pCi/l ±	2s
AK:FAIRBANKS	4/12/84	-0.1	0.1
AL:DOTHAN	4/ 6/84	0.1	0.1
AL:MONTGOMERY	1/10/84	0.1	0.1
AL:MUSCLE SHOALS	1/ 5/84	-0.1	0.1
AL:SCOTTSBORO	1/ 4/84	0.1	0.1
AR:LITTLE ROCK	7/ 3/84	0.1	0.1
CA:BERKELEY	10/10/84	-1.9	0.2
CA:LOS ANGELES	7/ 5/84	0.1	0.1
CO:DENVER	4/17/84	-0.1	0.1
CO:PLATTEVILLE	4/17/84	-0.1	0.1
CT:HARTFORD	4/ 5/84	0.0	0.1
DC:WASHINGTON	10/ 5/84	-0.2	0.1
DE:DOVER	1/ 3/84	0.1	0.1
FL:MIAMI	1/ 3/84	-0.1	0.1
FL:TAMPA	7/16/84	0.0	0.1
GA:SAVANNAH	1/10/84	0.0	0.1
HI:HONOLULU	4/18/84	0.2	0.1
IA:CEDAR RAPIDS	10/ 8/84	0.0	0.2
ID:BOISE	5/ 2/84	0.1	0.1
ID:IDAHO FALLS	4/20/84	-0.1	0.1
IL:MORRIS	1/ 4/84	0.2	0.2
IL:W. CHICAGO	1/ 5/84	0.1	0.1
KS:TOPEKA	1/ 4/84	0.2	0.2
LA:NEW ORLEANS	4/27/84	0.2	0.1
MA:LAWRENCE	1/ 4/84	0.6	0.2
MA:ROWE	4/24/84	0.3	0.1
MD:BALTIMORE	1/ 3/84	0.1	0.1
MD:CONOWINGO	1/10/84	0.0	0.1
ME:AUGUSTA	1/ 4/84	0.1	0.2
MI:DETROIT	1/ 9/84	0.0	0.1
MI:GRAND RAPIDS	7/17/84	-0.2	0.1
MN:MINNEAPOLIS	1/ 3/84	0.0	0.1
MN:RED WING	4/10/84	0.2	0.1
MS:JACKSON	4/ 3/84	0.2	0.1
MS:PORT GIBSON	1/10/84	0.0	0.1
MT:HELENA	1/ 3/84	0.0	0.1
NC:CHARLOTTE	7/ 9/84	0.1	0.1
NC:WILMINGTON	1/ 5/84	0.0	0.1
ND:BISMARCK	1/ 4/84	0.1	0.1
NE:LINCOLN	4/27/84	0.2	0.1

TABLE 13 (CONTINUED)

IODINE-131 IN DRINKING WATER
1984

LOCATION	DATE COLLECTED	pCi/l ± 2s	
NH:CONCORD	4/ 6/84	0.1	0.1
NJ:TRENTON	6/27/84	0.0	0.1
NJ:WARETOWN	6/26/84	0.0	0.1
NV:LAS VEGAS	7/ 3/84	0.2	0.1
NY:ALBANY	1/11/84	0.0	0.1
NY:NEW YORK CITY	4/ 5/84	0.2	0.1
NY:NIAGARA FALLS	1/ 5/84	0.6	0.2
NY:SYRACUSE	1/10/84	-0.1	0.1
OH:CINCINNATI	1/ 3/84	0.1	0.1
OH:COLUMBUS	1/10/84	0.2	0.1
OH:EAST LIVERPOOL	4/11/84	-0.2	0.1
OH:PAINESVILLE	1/10/84	0.0	0.1
OH:TOLEDO	1/ 4/84	0.1	0.1
OK:OKLAHOMA CITY	4/ 6/84	0.2	0.1
OR:PORTLAND	1/ 4/84	0.1	0.1
PA:COLUMBIA	4/12/84	-0.1	0.1

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program are used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. The program consists of approximately 22 sites representing a wide geographic coverage throughout the country.* Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters(TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of three TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle.** Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period October - December 1984 are shown in Table 14.

* Some of these sites may not return dosimeters each period and consequently the number of sites listed may vary slightly.

** Starting October, 1984, this program will change to a quarterly cycle.

TABLE 14

OCTOBER - DECEMBER 1984

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
AL:MONTGOMERY	100184- 10785	19.5	8.3	7.4
CA:BERKELEY	100384- 10385	13.1	5.9	6.3
CO:DENVER	100284- 10885	39.9	17.0	2.9
FL:ORLANDO	100184- 10285	11.7	5.3	8.5
ID:BOISE	101684- 11085	25.7	12.5	4.1
IL:CHICAGO	101884- 10285	12.9	7.0	6.9
ND:BISMARCK	100384- 10285	22.5	10.3	5.2
NJ:TRENTON	101984- 10385	21.8	12.0	4.7
NM:SANTA FE	100484- 10485	31.9	14.4	14.4
NV:LAS VEGAS	100384- 10785	19.2	8.3	5.9
NY:NEW YORK	101784- 12585	19.2	8.0	7.2
OH:COLUMBUS	100184- 10285	20.0	8.9	7.7
OK:OKLAHOMA CITY	101084- 11585	20.7	8.9	4.5
OR:PORTLAND	100284- 11685	24.2	9.5	4.1
PA:HARRISBURG	100184- 10385	13.6	6.0	7.7
RI:PROVIDENCE	101084- 10985	25.0	11.5	7.9
SC:BARNWELL	101984- 10385	14.6	8.0	6.6
SC:COLUMBIA	100284- 10285	18.5	8.4	9.8
TN:KNOXVILLE	100484- 10485	21.5	9.8	7.8
VA:RICHMOND	100484- 10485	19.7	8.9	6.3
VT:MONTPELIER	101184- 11085	19.2	8.8	2.7

* s = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general population's intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for October - December 1984 are shown in Tables 15 - 17.

Strontium values from regional composite samples collected October - December 1984 are shown in Table 18.

TABLE 15

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

OCTOBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	10/ 4/84	1.58 0.13	2 7	-4 9	1 7
AR:LITTLE ROCK	10/ 8/84	1.56 0.13	4 7	2 9	7 7
AZ:PHOENIX	10/11/84	1.50 0.09	-1 5	-2 6	2 5
CA:LOS ANGELES	10/22/84	1.55 0.13	-2 7	-1 9	3 7
CA:SACRAMENTO	10/ 4/84	1.53 0.13	-2 7	2 9	2 7
CA:SAN FRANCISCO	10/ 4/84	1.50 0.12	2 7	-5 9	5 7
CT:HARTFORD	10/ 1/84	1.55 0.13	6 7	-9 9	4 7
FL:TAMPA	10/ 8/84	1.46 0.12	11 7	-3 9	2 7
GA:ATLANTA	10/ 1/84	1.53 0.13	3 7	-4 9	3 7
IA:DES MOINES	10/ 2/84	1.58 0.13	4 7	3 9	5 7
ID:IDAHO FALLS	10/18/84	1.53 0.09	0 5	0 6	1 5
IL:CHICAGO	10/ 1/84	1.49 0.12	6 7	-2 9	1 7
IN:INDIANAPOLIS	10/ 9/84	1.49 0.12	1 7	-6 9	2 7
KS:WICHITA	10/ 8/84	1.60 0.13	2 7	-3 9	3 7
KY:LOUISVILLE	10/ 2/84	1.56 0.13	0 7	-3 9	5 7
LA:NEW ORLEANS	10/10/84	1.54 0.13	5 7	3 9	0 7
MA:BOSTON	10/ 2/84	1.59 0.13	7 7	4 9	6 7
MD:BALTIMORE	10/ 5/84	1.52 0.13	4 7	2 9	5 7
ME:PORTLAND	10/ 9/84	1.59 0.09	2 5	-1 6	-1 5
MI:DETROIT	10/11/84	1.60 0.13	0 7	3 9	1 7
MI:GRAND RAPIDS	10/ 8/84	1.56 0.09	5 5	-4 6	0 5
MN:MINNEAPOLIS	10/ 1/84	1.62 0.24	-3 18	3 19	7 14
MN:ST. PAUL	10/ 2/84	1.51 0.13	2 7	-1 9	1 7
MO:KANSAS CITY	10/11/84	1.48 0.08	4 5	3 6	3 5
MO:ST. LOUIS	10/ 3/84	1.49 0.12	0 7	-2 9	3 7
MS:JACKSON	10/ 8/84	1.54 0.13	4 7	0 9	1 7
MT:HELENA	10/16/84	1.41 0.12	2 7	2 9	-1 7
NC:CHARLOTTE	10/ 8/84	1.72 0.24	5 18	5 19	4 14
ND:MINOT	10/29/84	1.64 0.13	-3 7	-6 9	5 7
NE:OMAHA	10/ 5/84	1.56 0.13	-3 7	3 9	2 7
NH:CONCORD	10/ 1/84	1.53 0.13	2 7	3 9	-1 7
NJ:TRENTON	10/ 3/84	1.50 0.12	2 7	1 9	-2 7
NV:LAS VEGAS	10/ 8/84	1.56 0.13	2 7	-6 9	2 7
NY:BUFFALO	10/ 9/84	1.50 0.08	4 5	-2 6	2 5
NY:NEW YORK CITY	10/ 1/84	1.48 0.12	0 7	1 9	7 7
NY:SYRACUSE	10/ 1/84	1.60 0.13	5 7	1 9	-2 7
OH:CINCINNATI	10/ 1/84	1.52 0.13	2 7	1 9	-3 7
OH:CLEVELAND	10/ 8/84	1.54 0.13	1 7	-5 9	2 7

TABLE 15 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

OCTOBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
OK:OKLAHOMA CITY	10/ 1/84	1.55 0.13	4 7	-6 9	2 7
OR:PORTLAND	10/ 9/84	1.52 0.13	2 7	-2 9	5 7
PA:PITTSBURGH	10/10/84	1.36 0.12	2 7	-2 9	2 7
PC:CRISTOBAL	10/25/84	1.45 0.12	16 7	-4 9	3 7
PR:SAN JUAN	10/18/84	1.55 0.13	5 7	-2 9	-3 7
SC:CHARLESTON	10/ 3/84	1.57 0.13	1 7	-4 9	-2 7
SC:CHARLESTON	10/16/84	1.44 0.12	7 7	3 9	4 7
SD:RAPID CITY	10/ 8/84	1.43 0.12	-1 7	2 9	2 7
TN:CHATTANOOGA	10/ 9/84	1.57 0.13	0 7	-8 9	1 7
TN:KNOXVILLE	10/ 9/84	1.52 0.13	2 7	0 9	-4 7
TN:MEMPHIS	10/25/84	1.52 0.09	-1 5	-3 6	0 5
TX:AUSTIN	10/15/84	1.51 0.09	4 5	-3 6	1 5
UT:SALT LAKE CITY	10/ 8/84	1.57 0.09	3 5	-4 6	2 5
VA:NORFOLK	10/10/84	1.61 0.13	1 7	-7 9	8 7
VT:BURLINGTON	10/ 4/84	1.45 0.12	3 7	-3 9	5 7
WA:SEATTLE	10/ 1/84	1.58 0.13	4 7	-3 9	4 7
WI:MILWAUKEE	10/31/84	1.52 0.13	5 7	-1 9	1 7
WV:CHARLESTON	10/31/84	1.59 0.09	2 5	2 6	0 5
WY:LARAMIE	10/ 4/84	1.51 0.13	1 7	-1 9	1 7

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 16

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

NOVEMBER 1984

LOCATION	DATE COLLECTED	K g/l±2s		^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
AK:ANCHORAGE	11/ 1/84	1.83	0.17	3	13	1	13	2	10
AL:MONTGOMERY	11/ 8/84	1.72	0.13	4	7	-4	9	-4	7
AR:LITTLE ROCK	11/ 5/84	1.53	0.13	4	7	-3	9	1	7
AZ:PHOENIX	11/ 8/84	1.62	0.13	7	7	-6	9	3	7
CA:LOS ANGELES	11/26/84	1.53	0.13	1	7	-9	9	8	7
CA:SACRAMENTO	11/ 2/84	1.51	0.12	6	7	-3	9	2	7
CA:SAN FRANCISCO	11/ 2/84	1.54	0.13	4	7	4	9	4	7
CO:DENVER	11/ 1/84	1.44	0.12	6	7	2	9	1	7
CO:DENVER	11/30/84	1.44	0.08	2	5	1	6	6	5
CT:HARTFORD	11/ 5/84	1.59	0.13	2	7	-3	9	5	7
FL:TAMPA	11/13/84	1.68	0.13	5	7	-2	9	-3	7
GA:ATLANTA	11/ 2/84	1.56	0.13	6	7	-3	9	0	7
HI:HONOLULU	11/ 7/84	1.52	0.13	-2	7	-4	9	2	7
IA:DES MOINES	11/ 1/84	1.47	0.07	3	4	-2	5	0	4
ID:IDAHO FALLS	11/ 8/84	1.58	0.13	0	7	-1	9	-4	7
IL:CHICAGO	11/ 5/84	1.57	0.09	0	5	-1	6	1	5
IN:INDIANAPOLIS	11/ 5/84	1.51	0.12	6	7	-5	9	-1	7
KS:WICHITA	11/ 5/84	1.48	0.12	3	7	3	9	0	7
KY:LOUISVILLE	11/ 7/84	1.67	0.13	1	7	-8	9	0	7
LA:NEW ORLEANS	11/19/84	1.48	0.12	1	7	3	9	-1	7
MA:BOSTON	11/ 6/84	1.57	0.09	2	5	-2	6	2	5
MD:BALTIMORE	11/ 2/84	1.55	0.13	1	7	-3	9	-1	7
ME:PORTLAND	11/ 6/84	1.62	0.13	6	7	-7	9	5	7
MI:DETROIT	11/ 8/84	1.59	0.13	-4	7	0	9	2	7
MI:GRAND RAPIDS	11/ 6/84	1.63	0.13	1	7	-4	9	4	7
MN:MINNEAPOLIS	11/ 5/84	1.54	0.13	3	7	-2	9	0	7
MN:ST. PAUL	11/ 5/84	1.77	0.25	16	18	7	19	-2	14
MO:KANSAS CITY	11/ 9/84	1.46	0.12	3	7	0	9	0	7
MO:ST. LOUIS	11/ 7/84	1.54	0.13	-2	7	-5	9	2	7
MS:JACKSON	11/ 8/84	1.47	0.12	5	7	-4	9	5	7
MT:HELENA	11/ 8/84	1.52	0.09	1	5	-3	6	2	5
NC:CHARLOTTE	11/ 6/84	1.71	0.24	5	18	11	19	2	14
ND:MINOT	11/26/84	1.56	0.13	1	7	-2	9	9	7
NH:MANCHESTER	11/ 5/84	1.51	0.12	1	7	-2	9	3	7
NJ:TRENTON	11/ 7/84	1.59	0.09	1	5	-2	6	2	5
NM:ALBUQUERQUE	11/26/84	1.43	0.12	1	7	-5	9	5	7
NV:LAS VEGAS	11/ 6/84	1.57	0.09	1	5	0	6	1	5
NY:BUFFALO	11/13/84	1.57	0.13	1	7	-6	9	-1	7

TABLE 16 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

NOVEMBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
NY:NEW YORK CITY	11/ 5/84	1.56 0.13	0	7	-7	9	3	7
NY:SYRACUSE	11/ 5/84	1.58 0.13	2	7	-11	9	4	7
OH:CINCINNATI	11/ 5/84	1.54 0.13	3	7	-2	9	2	7
OH:CLEVELAND	11/ 7/84	1.56 0.13	-1	7	0	9	4	7
OK:OKLAHOMA CITY	11/ 5/84	1.49 0.09	3	5	0	6	4	5
PA:PHILADELPHIA	11/13/84	1.49 0.12	0	7	-1	9	2	7
PA:PITTSBURGH	11/ 7/84	1.74 0.24	-3	18	-5	18	-2	14
PC:CRISTOBAL	11/29/84	1.48 0.12	19	7	-5	9	0	7
PR:SAN JUAN	11/ 9/84	1.50 0.12	6	7	-1	9	3	7
SC:CHARLESTON	11/28/84	1.57 0.13	9	7	2	9	0	7
SD:RAPID CITY	11/ 5/84	1.61 0.13	-3	7	-1	9	1	7
TN:CHATTANOOGA	11/ 5/84	1.67 0.13	2	7	-2	9	5	7
TN:KNOXVILLE	11/ 5/84	1.64 0.09	5	5	-6	6	3	5
TN:MEMPHIS	11/28/84	1.54 0.13	4	7	-4	9	-1	7
TX:AUSTIN	11/ 7/84	1.49 0.12	2	7	-6	9	2	7
UT:SALT LAKE CITY	11/ 7/84	1.66 0.13	0	7	-6	9	1	7
VA:NORFOLK	11/16/84	1.63 0.09	2	5	-2	6	0	5
VT:BURLINGTON	11/ 2/84	1.48 0.12	4	7	0	9	1	7
WA:SEATTLE	11/ 9/84	1.56 0.13	-1	7	0	9	4	7
WI:MILWAUKEE	11/30/84	1.65 0.09	1	5	-5	6	3	5
WY:LARAMIE	11/11/84	1.69 0.13	3	7	-6	9	-1	7

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 17

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

DECEMBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	12/ 7/84	1.60 0.13	2 7	-5 9	3 7
AR:LITTLE ROCK	12/ 4/84	1.48 0.08	4 5	-5 6	1 5
AZ:PHOENIX	12/ 6/84	1.59 0.13	4 7	2 9	2 7
CA:LOS ANGELES	12/18/84	1.48 0.08	2 5	-4 6	0 5
CA:SACRAMENTO	12/ 6/84	1.64 0.13	0 7	0 9	4 7
CA:SAN FRANCISCO	12/ 3/84	1.55 0.13	2 7	-1 9	-1 7
CO:DENVER	11/30/84	1.43 0.12	1 7	1 9	2 7
CT:HARTFORD	12/ 3/84	1.52 0.13	0 7	-3 9	1 7
FL:TAMPA	12/11/84	1.49 0.12	11 7	-8 9	8 7
GA:ATLANTA	12/ 3/84	1.57 0.13	0 7	1 9	-6 7
HI:HONOLULU	12/ 1/84	1.57 0.13	-1 7	1 9	8 7
IA:DES MOINES	12/ 4/84	1.47 0.12	4 7	2 9	3 7
ID:IDAHO FALLS	12/ 6/84	1.58 0.13	3 7	4 9	3 7
IL:CHICAGO	12/ 3/84	1.55 0.13	5 7	-1 9	0 7
IN:INDIANAPOLIS	12/ 3/84	1.49 0.12	7 7	5 9	6 7
KS:WICHITA	12/10/84	1.51 0.12	-3 7	-1 9	-2 7
KY:LOUISVILLE	12/ 3/84	1.54 0.13	5 7	0 9	3 7
MA:BOSTON	12/ 4/84	1.61 0.13	2 7	-7 9	7 7
MD:BALTIMORE	12/ 7/84	1.60 0.09	2 5	0 6	6 5
ME:PORTLAND	12/ 4/84	1.83 0.25	12 18	14 19	3 14
MI:DETROIT	12/ 6/84	1.59 0.13	-1 7	-1 9	0 7
MI:GRAND RAPIDS	12/ 3/84	1.55 0.13	7 7	-1 9	2 7
MN:MINNEAPOLIS	12/ 3/84	1.55 0.13	2 7	-5 9	2 7
MN:ST. PAUL	12/ 4/84	1.52 0.13	-1 7	0 9	5 7
MO:KANSAS CITY	12/ 6/84	1.51 0.12	1 7	-1 9	5 7
MO:ST. LOUIS	12/ 5/84	1.55 0.13	5 7	-2 9	-2 7
MS:JACKSON	12/ 3/84	1.43 0.12	7 7	-3 9	1 7
NC:CHARLOTTE	12/12/84	1.77 0.24	16 18	-8 18	10 14
ND:MINOT	12/13/84	1.49 0.12	1 7	-3 9	6 7
NE:OMAHA	12/ 7/84	1.41 0.07	3 4	0 5	4 4
NH:MANCHESTER	12/ 3/84	1.57 0.09	6 5	-2 6	4 5
NJ:TRENTON	12/ 5/84	1.51 0.09	3 5	2 6	2 5
NM:ALBUQUERQUE	12/ 3/84	1.55 0.13	4 7	-5 9	1 7
NV:LAS VEGAS	12/ 3/84	1.46 0.12	4 7	0 9	2 7
NY:BUFFALO	12/ 3/84	1.57 0.09	4 5	-7 6	4 5
NY:NEW YORK CITY	12/ 3/84	1.57 0.13	2 7	1 9	2 7
NY:SYRACUSE	12/ 3/84	1.54 0.13	-2 7	-1 9	0 7
OH:CINCINNATI	12/ 4/84	1.52 0.09	-6 5	6 6	2 5

TABLE 17 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

DECEMBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
OH:CLEVELAND	12/10/84	1.55 0.13	2 7	-6 9	-1 7
OR:PORTLAND	12/ 3/84	1.48 0.12	1 7	2 9	6 7
PA:PHILADELPHIA	12/ 3/84	1.54 0.13	0 7	3 9	1 7
PA:PITTSBURGH	12/ 5/84	1.46 0.24	2 18	12 19	6 14
PC:CRISTOBAL	12/20/84	1.54 0.09	12 5	-2 6	2 5
PR:SAN JUAN	12/13/84	1.49 0.12	5 7	0 9	5 7
SD:RAPID CITY	12/ 5/84	1.60 0.13	3 7	-1 9	3 7
TN:CHATTANOOGA	12/ 3/84	1.64 0.13	2 7	-3 9	0 7
TN:KNOXVILLE	12/ 3/84	1.45 0.12	4 7	2 9	-3 7
TN:MEMPHIS	12/27/84	1.53 0.13	1 7	-7 9	-1 7
TX:AUSTIN	12/ 3/84	1.45 0.12	3 7	4 9	0 7
UT:SALT LAKE CITY	12/ 3/84	1.56 0.13	3 7	-6 9	5 7
VA:NORFOLK	12/13/84	1.51 0.12	4 7	-6 9	5 7
VT:BURLINGTON	12/ 3/84	1.56 0.09	5 5	2 6	3 5
WA:SEATTLE	12/ 4/84	1.56 0.09	2 5	-2 6	0 5
WI:MILWAUKEE	11/30/84	1.64 0.13	3 7	-6 9	1 7
WV:CHARLESTON	12/18/84	1.50 0.12	3 7	2 9	3 7
WY:LARAMIE	12/ 4/84	1.60 0.13	-1 7	-3 9	2 7

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 18

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

OCTOBER - DECEMBER 1984

EPA REGION	^{90}Sr pCi/l ± 2s	^{89}Sr pCi/l ± 2s*
I	2.1 0.6	1 1
II	2.1 0.7	1 1
III	2.1 0.7	1 1
IV	2.6 0.9	-1 1
V	2.2 0.6	1 1
VI	2.5 0.7	0 1
VII	2.4 0.9	0 2
VIII	1.4 0.6	1 2
IX	0.6 0.8	1 1
X	1.1 0.7	0 2

s SIGMA COUNTING ERROR
s* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

Data will be published as it becomes available.

ENVIRONMENTAL RADIATION DATA (ERD) is published quarterly (January, April, July, October) by the U. S. Environmenta

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